

REMARKS

This communication is in response to the Office Action of March 26, 2007.

Claims 1-32 are pending in this application. Claims 4, 16, and 19 have been amended to correct for minor typographical errors. Claim 30 has been amended to more specifically point out and distinctly claim the subject matter of the invention.

As requested by the Examiner, Applicants enclose page 3 of the specification in light of the scanning artifact which occurred within the USPTO.

Claims 1-32 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Ribas-Corbera, U.S. Patent No. 6,535,251 ("Ribas-Corbera"). Applicants traverse the rejections. Reconsideration of these claims is respectfully requested.

Applicants respectfully submit that Ribas-Corbera does not disclose the rate controller as claimed in Claim 1 or the method as claimed in Claim 30 because the video encoder described therein does not select "the maximum permissible" of two step sizes computed with either a VBR or CBR controller prior to encoding a given frame.

Ribas-Corbera discloses computing a quantization set size "subject to the range defined by the minimum and maximum step sizes" (Ribas-Corbera, col. 2, lines 43-44.) For example, the quantization step size is set to be *lower* than the maximum step size. As described in Ribas-Corbera, "first set $Q=Q_1$. Then, if $Q>Q_{MAX}$, set $Q=Q_{MAX}$. In other words, if the first quantization value exceeds the computed maximum step size, setting the quantization step size lower than the first quantization value. In addition, it is preferred to set $Q=Q_{MAX}$ only if $B_{GOP} < B_{MAX}$." (Ribas-Corbera, col. 7, lines 5-9.)

As such, Ribas-Corbera does not disclose a rate controller of the type called for in Claim 1 having "a selector configured to select a maximum permissible quantization step size from said first quantization step size and said second quantization step size for use by a quantizer in quantizing transform data" (Claim 1,) nor does it disclose the rate control method called for in Claim 30 comprising "selecting a maximum quantization step size from said first quantization step size and said second quantization step size for use in quantizing compressed image data" (Claim 30.)

In the claimed invention, “[T]he CBR rate controller 290 and the core VBR rate controller 280 make independent calculations of bit rate and a selection module 510 selects the maximum of the two bit rates. The final VBR quantizer scale, Q_{VBR} , is selected as the larger of the two proposed values:

$$Q_{VBR} = \begin{cases} \tilde{Q}_{VBR} & \text{if } \tilde{Q}_{VBR} > Q_{CBR} \\ Q_{CBR} & \text{otherwise} \end{cases}$$

(specification, paragraph [0058].)

That is, the claimed invention discloses computing “a first quantization step size” with a VBR controller, computing “a second quantization step size” with a CBR controller, and using a selector to select “the larger of the two proposed values.” On the contrary, as noted above, Ribas-Corbera discloses computing one step size, i.e., Q_1 , comparing that step size to a maximum step size, and selecting the lower of the two.

Only in the eventual case that “ $B_{GOP} = B_{MAX}$ ” does Ribas-Corbera disclose selecting the larger step size (Ribas-Corbera, col. 7, lines 22-23.) Even then, the maximum step size is neither “a first quantization step size” generated by “a variable bit rate (VBR) controller” nor “a second quantization step size” generated by “a constant bit rate (CBR) controller.” Rather, the maximum step size disclosed in Ribas-Corbera works as a hard ceiling. As shown with reference to FIG. 6 of Ribas-Corbera, quantization step size Q_1 is computed at step 140, and then the lower of Q_1 and Q_{MAX} (which is set to Q_C at step 120) is selected (step 150) to encode a frame (steps 160.)

That is, Q_{MAX} is simply set to Q_C prior to the selection of the quantization step size. In contrast to the present invention, Q_{MAX} is not generated by a VBR or a CBR controller. Q_{MAX} may be eventually adjusted to be smaller than Q_C , but the adjustment occurs *after* selecting the quantization step size that is used to encode the frame and does not involve a VBR or a CBR controller.

As disclosed in Ribas-Corbera, the adjustment is performed (step 190 of FIG. 6) by calculating “[A]a usage variable P_{ERR} , also known as percentage of error P_{ERR} ” (Ribas-Corbera, col. 8, lines 8-9) and changing the value of Q_{MAX} depending on the value of P_{ERR} . The

adjustment is not performed with a VBR or a CBR controller prior to selection of a quantization step size for encoding the frame.

In short, the video encoder and method disclosed in Ribas-Corbera do not disclose the rate controller of the type called for in Claim 1 or the method claimed in Claim 30 because they do not select the larger of two step sizes computed with either a VBR or CBR controller prior to encoding a given frame.

Therefore, Applicants respectfully submit that Ribas-Corbera does not anticipate Claims 1 and 30, as well as Claims 2-9 and 31-32, which respectfully depend there from. Since Ribas-Corbera fails to anticipate the claimed inventions of Claims 1 and 30, Applicants respectfully submit that Claims 1 and 30 and their respective dependent claims, distinguish from, and are allowable over, the cited reference.

Ribas-Corbera also does not disclose “a constant bit rate controller” of the type called for in Claim 10 and “a method of constant bit rate (CBR) rate control” of the type called for in Claim 16. Both the constant bit rate controller claimed in Claim 10 and the method of constant bit rate control claimed in Claim 16 determine “a statistical frequency of macroblock types” within a “current picture.” The constant bit rate controller claimed in Claim 10 has “a picture analysis module configured to determine a statistical frequency of each of at least two different types of macroblocks within a current picture and for forming at least one statistical indicator of the complexity of each of said at least two different types of macroblocks.”

In contrast and as noted above, the video encoder and method disclosed in Ribas-Corbera “tracks a complexity parameter of the encoded scenes, and computes a first quantization value in dependence upon the generated complexity parameter” (Ribas-Corbera, col. 2, lines 34-36.) “This is accomplished by computing a first quantization value Q_1 . This computation is in dependence upon the generated complexity parameters X_I , X_P , X_B from previous scenes.” (Ribas-Corbera, col. 6, lines 20-22).

That is, the complexity parameter disclosed in Ribas-Corbera is computed from statistics of *previous*, rather than *current*, frames. In short, Ribas-Corbera does not disclose computing “a statistical frequency of macroblock types” within a “current picture” as claimed in Claims 10 and 16.

Therefore, Applicants respectfully submit that Ribas-Corbera does not anticipate Claims 10 and 16, as well as Claims 11-15 and 17-26, which respectfully depend there from. Since Ribas-Corbera fails to anticipate the claimed inventions of Claims 10 and 16, Applicants respectfully submit that Claims 10 and 16 and their respective dependent claims, distinguish from, and are allowable over, the cited reference.

Regarding independent Claim 27, Ribas-Corbera does not disclose "measuring changes in long-term average bit rate" as suggested by the Examiner. In particular, Applicants can find no disclosure in the sections cited by the Examiner that the long-term average bit rate is tracked. As shown and described in Ribas-Corbera with reference to FIG. 6, the updating that takes place in step 180 is performed on a GOP basis rather than on a "long-term" basis. That is, the average bit rate that is tracked is tracked after the encoding of each new GOP and not "long-term" for an "output bitstream of said encoder."

Therefore, Applicants respectfully submit that Ribas-Corbera does not anticipate Claim 27, as well as Claims 28-29, which respectfully depend there from. Since Ribas-Corbera fails to anticipate the claimed invention of Claims 27, Applicants respectfully submit that Claim 27 and its respective dependent claims, distinguish from, and are allowable over, the cited reference.

In view of the foregoing amendments, Applicants believe that all rejections are rendered moot, and respectfully submit that the subject application is in condition for allowance. The Examiner is invited to contact the undersigned if there are any residual issues that can be resolved through a telephone call.

The Commissioner is hereby authorized to charge any appropriate fees to Deposit Account No. 50-1283.


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